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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/671,346	09/24/2003	Mohammad Jaber Borran	873.0119.U1(US)	7074
29683	7590	07/17/2007		
HARRINGTON & SMITH, PC 4 RESEARCH DRIVE SHELTON, CT 06484-6212			EXAMINER BURD, KEVIN MICHAEL	
			ART UNIT	PAPER NUMBER
			2611	
			MAIL DATE	DELIVERY MODE
			07/17/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

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<b>Office Action Summary</b>	<b>Application No.</b> 10/671,346	<b>Applicant(s)</b> BORRAN ET AL.	
	<b>Examiner</b> Kevin M. Burd	<b>Art Unit</b> 2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 09 July 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 41,42,45-50 and 53-58 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 41,42,45-50 and 53-58 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

1. This office action, in response to the request for continued examination filed 7/9/2007, is a final office action.

***Continued Examination Under 37 CFR 1.114***

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 7/9/2007 has been entered.

All claims are drawn to the same invention claimed in the application prior to the entry of the submission under 37 CFR 1.114 and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the application prior to entry under 37 CFR 1.114. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action after the filing of a request for continued examination and the submission under 37 CFR 1.114. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

### ***Response to Arguments***

3. The request for continued examination (RCE) received 7/9/2007 comprises no further amendments or remarks other than the amendment filed after final on 3/20/2007. The previous amendment was entered after final and an explanation of how the amended claims are rejected was provided in the advisory action mailed 4/25/2007. Those rejections and response to amendment are restated below.
4. Applicant does not address the previous claim rejection under 35 USC 101 nor does the applicant address the claim objection to claim 55 in the after final response. Both the claim rejection under 35 USC 101 and the claim objection are maintained.
5. Applicant's arguments filed 4/4/2007 have been fully considered but they are not persuasive. As stated in the previous office action, Falzon discloses "minimization of the Kullback-Leibler distance for estimating the parameters of the generalized Gaussian model ensures a minimization of the cost of coding in accordance with information theory" in paragraph 0024. Minimizing this term amounts therefore to choosing a model distribution  $p_2$ , which will produce the most efficient symbols for coding a distribution source  $p_1$  (paragraph 0068). Therefore,  $D(p_2||p_1)$  will be minimized (paragraph 0069). The symbols are selected according to a Kullback-Leibler distance. Therefore, the

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constellation points for transmission of those symbols are separated according to that Kullback-Leibler distance.

In addition, MPEP 2111.04 states "claim scope is not limited by claim language that suggests or makes optional but does not require steps to be performed, or by claim language that does not limit a claim to a particular structure". Examples of claim language that may raise a question as to the limiting effect of the language in a claim are (B) "wherein" clauses. MPEP 2111.04 further states a "whereby clause in a method claim is not given weight when it simply expresses the intended result of a process step positively recited". The wherein clause stated in the amended independent claims state "wherein the selected signal constellation consists of a plurality of symbols separated from one another by a maximized minimum conditional distribution that comprises a Kullback-Leibler distance." No step is being performed in the wherein clause. The clause expresses the result of the step of "selecting one of several signal constellations based on the determined characteristic". The data (signal constellations) stored in a storage medium of claim 49 is not a component of the device of claim 49 and therefore does not limit the claim to a particular structure.

### ***Claim Objections***

6. Claim 55 is objected to because of the following informalities: Claim 55 is dependent on claim 55. It is assumed for examination purposes claim 55 is dependent on claim 54. Appropriate correction is required.

***Claim Rejections - 35 USC § 101***

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

7. Claims 57-58 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The claim language does not correspond to the Interim Guidelines for patent Subject Matter Eligibility and MPEP 2106. The examiner suggests the claim recite a computer program of computer readable instructions tangibly embodied on a computer readable medium and executable by a digital data processor....

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 41, 42, 45, 46, 49, 50, 53, 54, 57 and 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fette et al (US 6,560,445) in view of Falzon et al (US 2003/0210824).

Regarding claim 41, Fette discloses a method of transmitting a signal. A transmitter modulates information onto a plurality of carriers (abstract). An actual signal-to-noise ratio value is received (column 9, lines 56-61). According to the received SNR

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value, a table or set of tables that permit automatic optimization of the communications link under varying conditions (column 9, lines 45-48) is accessed and the appropriate constellation is chosen (column 9, lines 37-40). The transmitter will modulate the carrier wave according to the selected constellation (column 9, lines 17-65). Fette does not disclose the symbols of the signal constellations are separated from one another by a Kullbeck-Leiber distance. Falzon discloses "minimization of the Kullback-Leiber distance for estimating the parameters of the generalized Gaussian model ensures a minimization of the cost of coding in accordance with information theory" in paragraph 0024. For this reason, it would have been obvious for one of ordinary skill in the art at the time of the invention to combine the teachings of Falzon into the method of Fette.

Regarding claim 42, as stated above, Fette discloses the signal constellation is selected according to the SNR. Figure 17 discloses the method as well.

Regarding claim 45, Fette discloses communication with a system 1000 in accordance with the invention is robust to impairments introduced by propagation effects of the communication link 1005 such as fading (column 10, lines 15-17).

Regarding claim 46, Fette discloses the transmitting of the selected constellation is done in a transmitter diversity system (figure 18). Therefore, the constellation selected is based on the number of transmit antennas.

Regarding claim 49, Fette discloses a device comprising a transmitter with an antenna coupled to the transmitter (figure 18). A storage medium stores a plurality of signal constellations (column 9, lines 37-48). Transceiver 1003 comprises a processor (column 9, lines 17-20) that receives an actual signal-to-noise ratio value (column 9,

lines 56-61). According to the received SNR value, a table or set of tables that permit automatic optimization of the communications link under varying conditions (column 9, lines 45-48) is accessed and the appropriate constellation is chosen (column 9, lines 37-40). The transmitter will modulate the carrier wave according to the selected constellation (column 9, lines 17-65). Fette does not disclose the symbols of the signal constellations are separated from one another by a Kullback-Leibler distance. Falzon discloses "minimization of the Kullback-Leibler distance for estimating the parameters of the generalized Gaussian model ensures a minimization of the cost of coding in accordance with information theory" in paragraph 0024. For this reason, it would have been obvious for one of ordinary skill in the art at the time of the invention to combine the teachings of Falzon into the method of Fette.

Regarding claim 50, as stated above, Fette discloses the signal constellation is selected according to the SNR.

Regarding claim 53, Fette discloses communication with a system 1000 in accordance with the invention is robust to impairments introduced by propagation effects of the communication link 1005 such as fading (column 10, lines 15-17).

Regarding claim 54, Fette discloses the transmitting of the selected constellation is done in a transmitter diversity system (figure 18). Therefore, the constellation selected is based on the number of transmit antennas.

Regarding claim 57, Fette discloses a processor (column 9, lines 17-20) for executing a computer program shown in figure 17 and described in column 9, lines 17-65. An actual signal-to-noise ratio value is received (column 9, lines 56-61). According



to the received SNR value, a table or set of tables that permit automatic optimization of the communications link under varying conditions (column 9, lines 45-48) is accessed and the appropriate constellation is chosen (column 9, lines 37-40). The transmitter will modulate the carrier wave according to the selected constellation (column 9, lines 17-65). Fette does not disclose the symbols of the signal constellations are separated from one another by a Kullback-Leibler distance. Falzon discloses "minimization of the Kullback-Leibler distance for estimating the parameters of the generalized Gaussian model ensures a minimization of the cost of coding in accordance with information theory" in paragraph 0024. For this reason, it would have been obvious for one of ordinary skill in the art at the time of the invention to combine the teachings of Falzon into the method of Fette.

Regarding claim 58, as stated above, Fette discloses the signal constellation is selected according to the SNR.

9. Claims 47, 48, 55 and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fette et al (US 6,560,445) in view of Falzon et al (US 2003/0210824) further in view of Huang et al (US 6,373,832).

Regarding claims 47 and 48, the combination of Fette and Falzon disclose the method stated above. The combination does not disclose the number of transmit antennas is determined from a message received over a wireless channel. Huang discloses a communication method with enhanced multipath diversity. A transceiver sends a feedback signal indicating the number of useful signals being received and the

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first transceiver responds by selecting and using a desirable number of transmit antennas (abstract). This technique of the invention could be applied in both transmit directions (column 3, lines 24-41). It would have been obvious for one of ordinary skill in the art at the time of the invention to combine the method of communication of Huang into the method of the combination of Fette and Falzon. The transmitting of the number of useful signals used in the transmitting of the data will allow the number of transmit antennas to be minimized to the number of antennas that are transmitting useful information, minimizing the amount of power consumed by the transceivers.

Regarding claims 55 and 56, the combination of Fette and Falzon disclose the device stated above. The combination does not disclose the number of transmit antennas is determined from a message received over a wireless channel. Huang discloses a communication device with enhanced multipath diversity. A transceiver sends a feedback signal indicating the number of useful signals being received and the first transceiver responds by selecting and using a desirable number of transmit antennas (abstract). This technique of the invention could be applied in both transmit directions (column 3, lines 24-41). It would have been obvious for one of ordinary skill in the art at the time of the invention to combine the device for communication of Huang into the device of the combination of Fette and Falzon. The transmitting of the number of useful signals used in the transmitting of the data will allow the number of transmit antennas to be minimized to the number of antennas that are transmitting useful information, minimizing the amount of power consumed by the transceivers.

### ***Conclusion***

All claims are drawn to the same invention claimed in the application prior to the entry of the submission under 37 CFR 1.114 and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the application prior to entry under 37 CFR 1.114. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action after the filing of a request for continued examination and the submission under 37 CFR 1.114. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M. Burd whose telephone number is (571) 272-3008. The examiner can normally be reached on Monday - Friday 9 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David C. Payne can be reached on (571) 272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kevin M. Burd  
7/13/2007

  
**KEVIN BURD**  
**PRIMARY EXAMINER**